

Appl. No. *To Be Assigned*; Filed: *Herewith*  
Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
Title: Novel Cellulases, the Genes Encoding Them and Uses  
Thereof

ALK04179: pH-DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

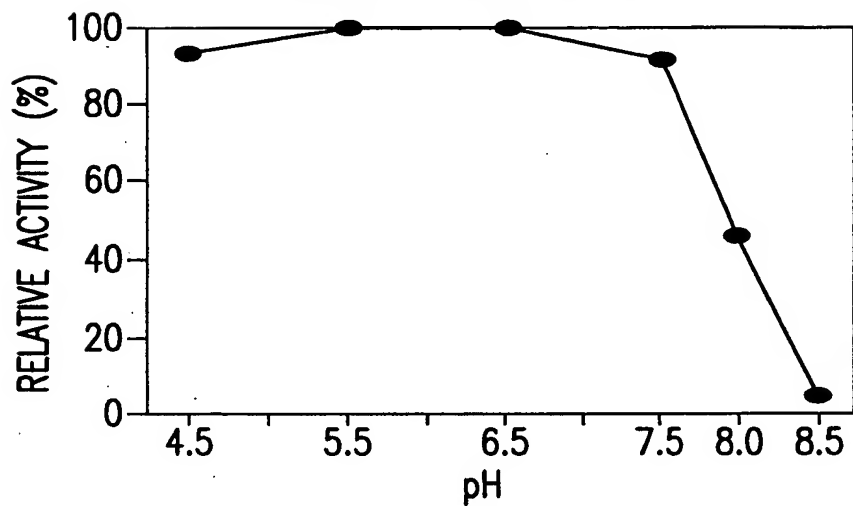


FIG.1A

ALK04179: TEMPERATURE DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

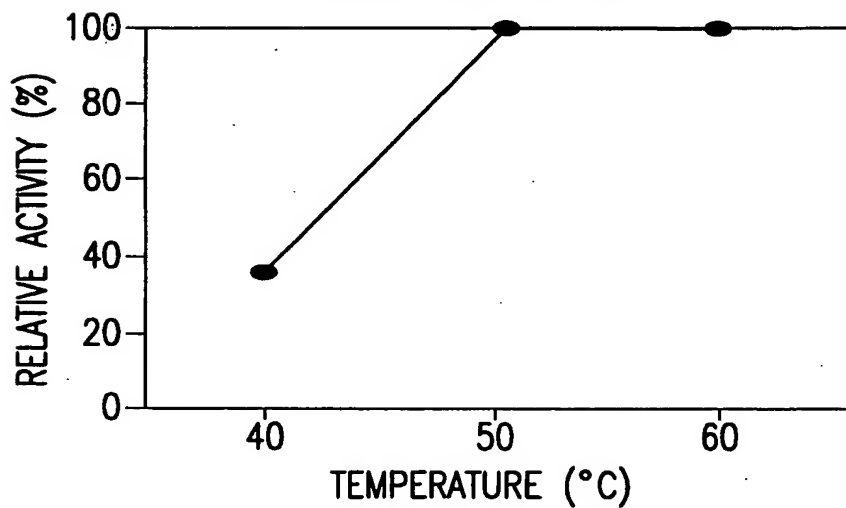


FIG.1B

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ALKO4124: pH-DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

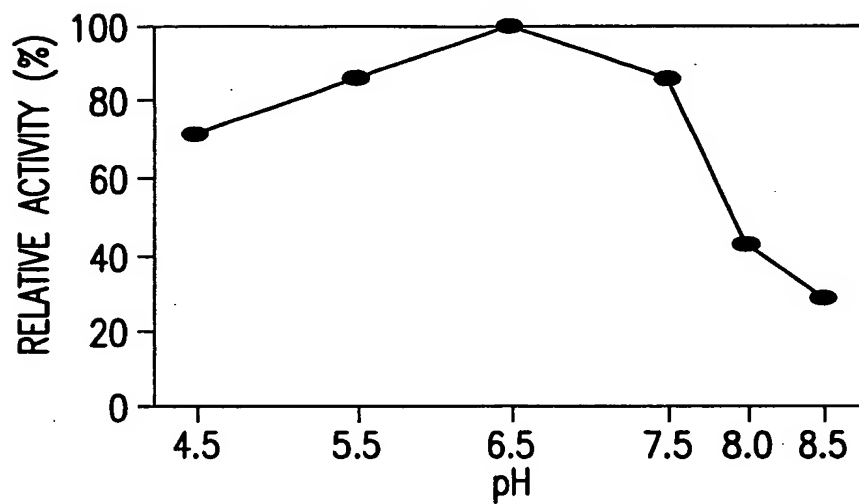


FIG.2A

ALKO4124: TEMPERATURE DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

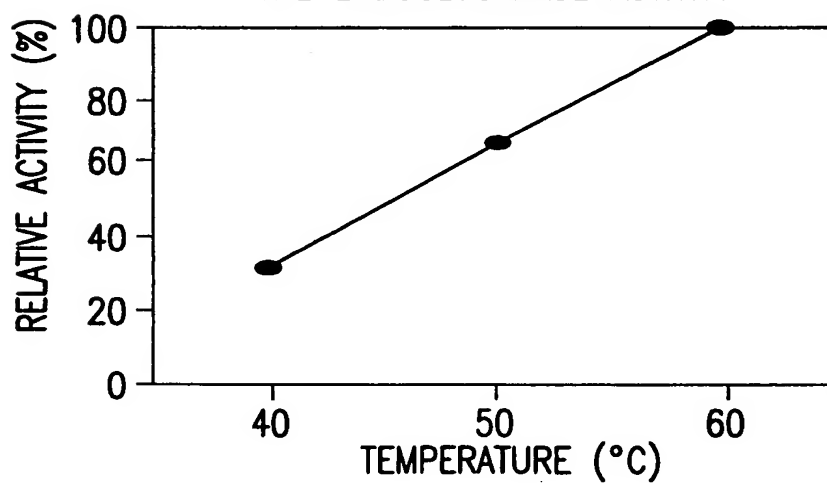


FIG.2B

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ALKO4237: pH-DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

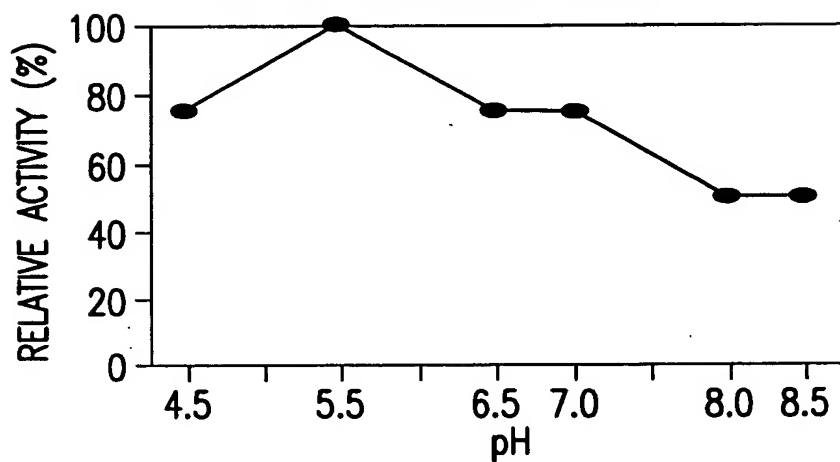


FIG.3A

ALKO4237: TEMPERATURE DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

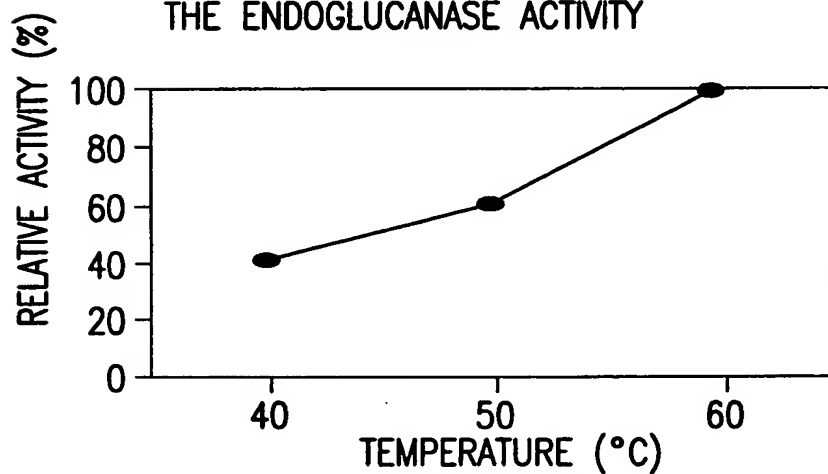


FIG.3B

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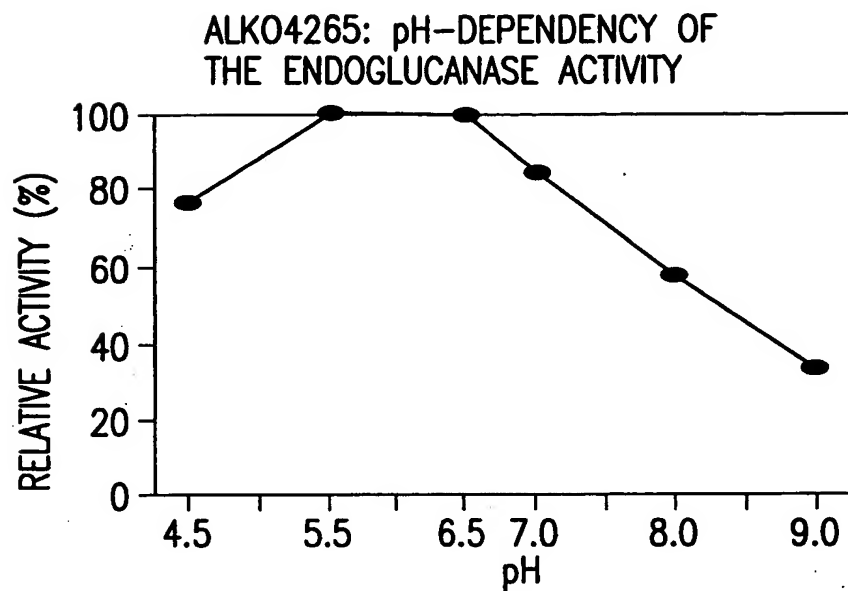


FIG.4A

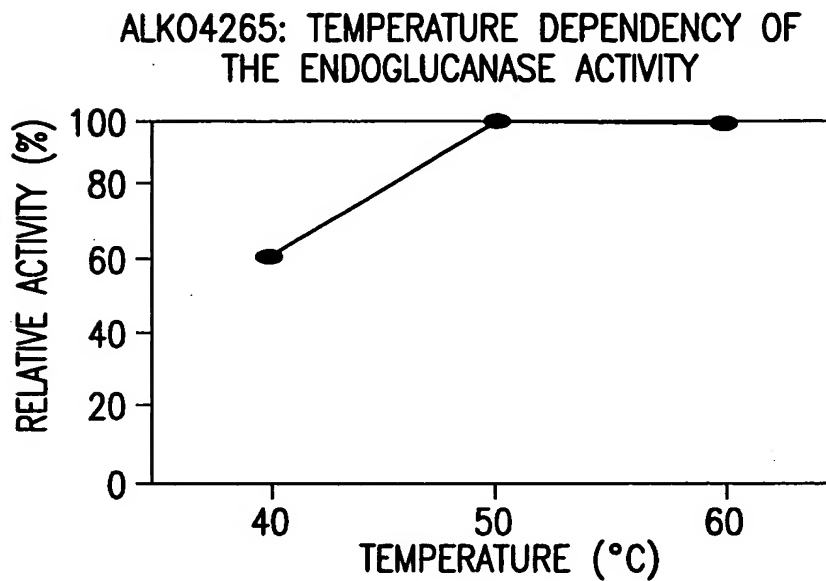


FIG.4B

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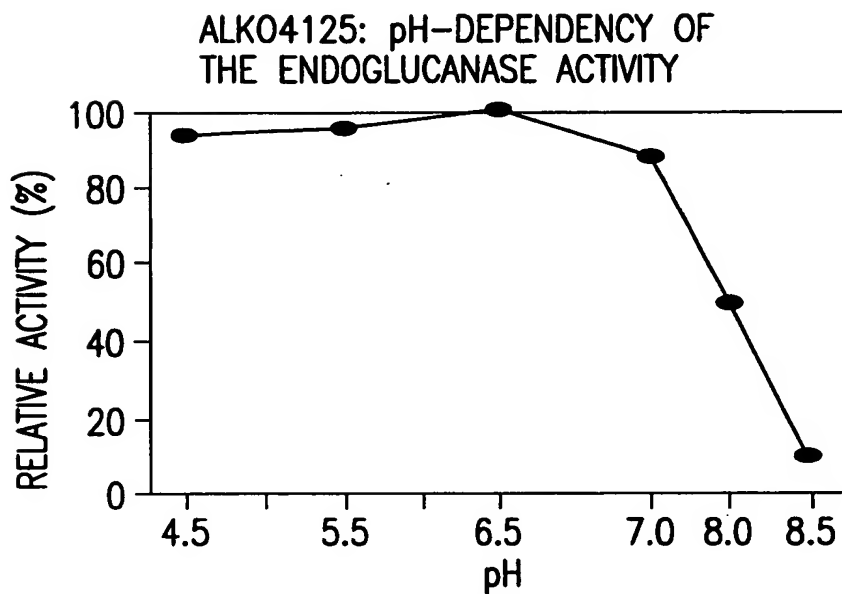


FIG.5A

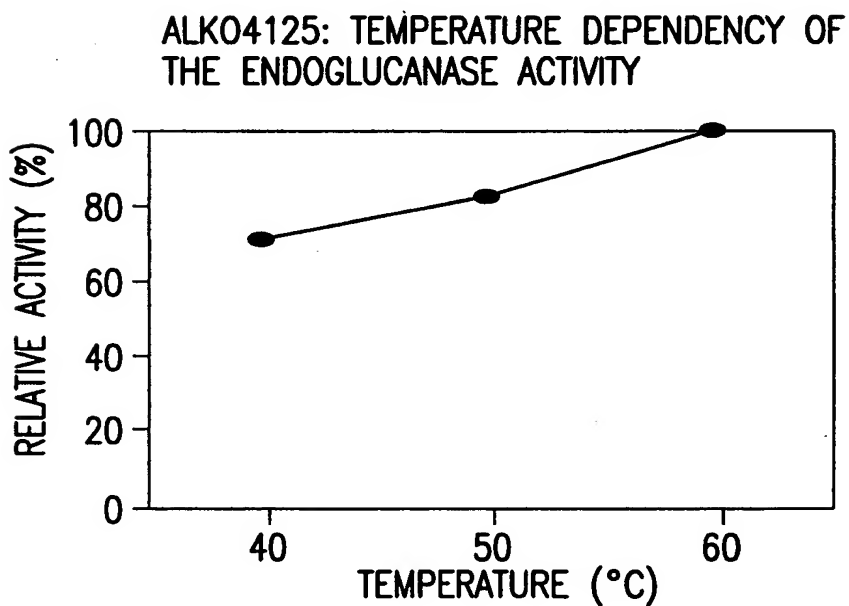


FIG.5B

# WASH EFFECT AND BACKSTAINING WITH NEUTRAL CELLULASES

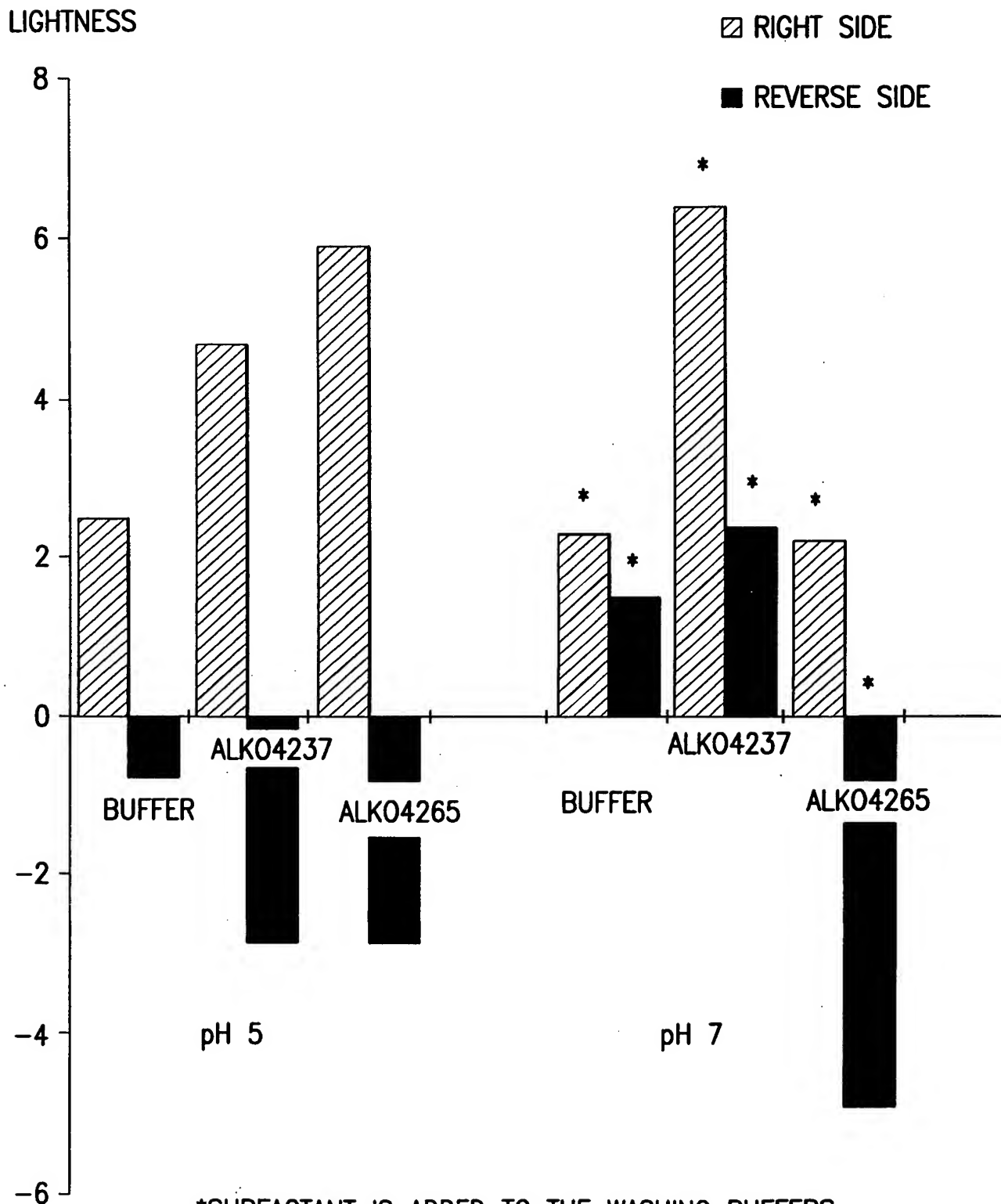


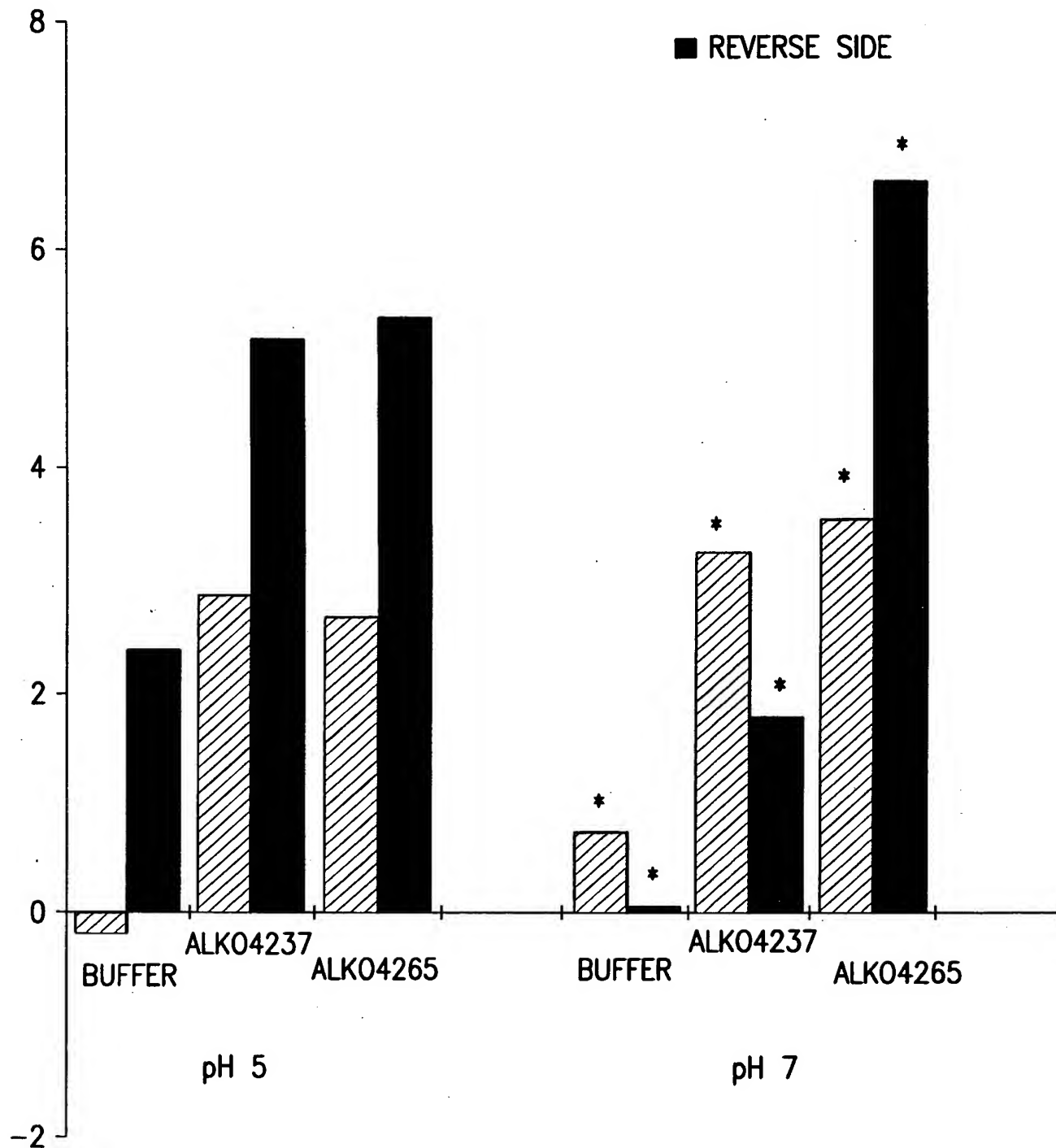
FIG.6A

## BLUENESS WITH THE NEUTRAL CELLULASES

BLUENESS

▨ RIGHT SIDE

■ REVERSE SIDE



\*SURFACTANT ADDED TO THE WASHING BUFFERS

FIG.6B

# WASH EFFECT AND BACKSTAINING WITH ECOSTONE L

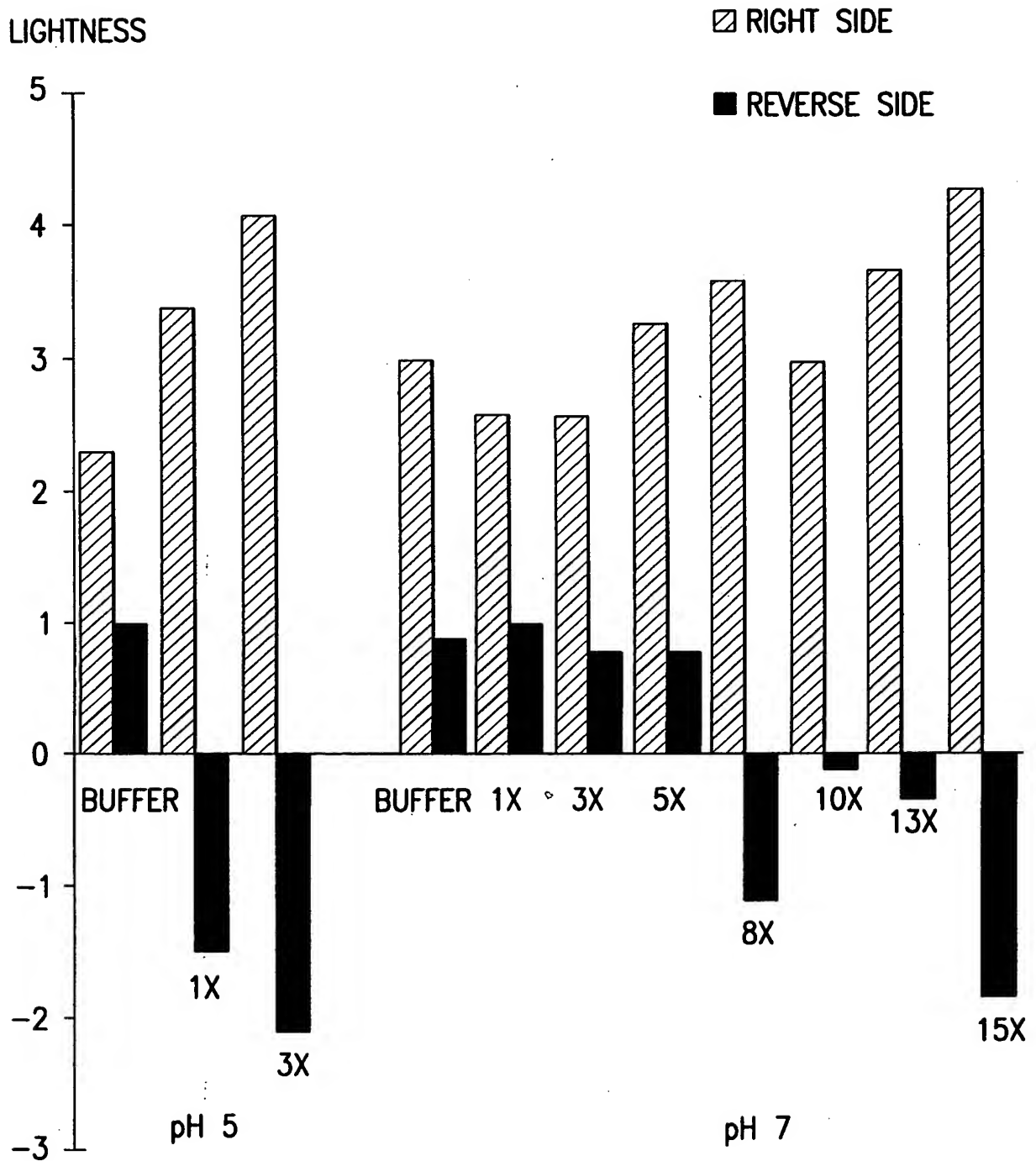


FIG.7A



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# BLUENESS WITH ECOSTONE L

BLUENESS

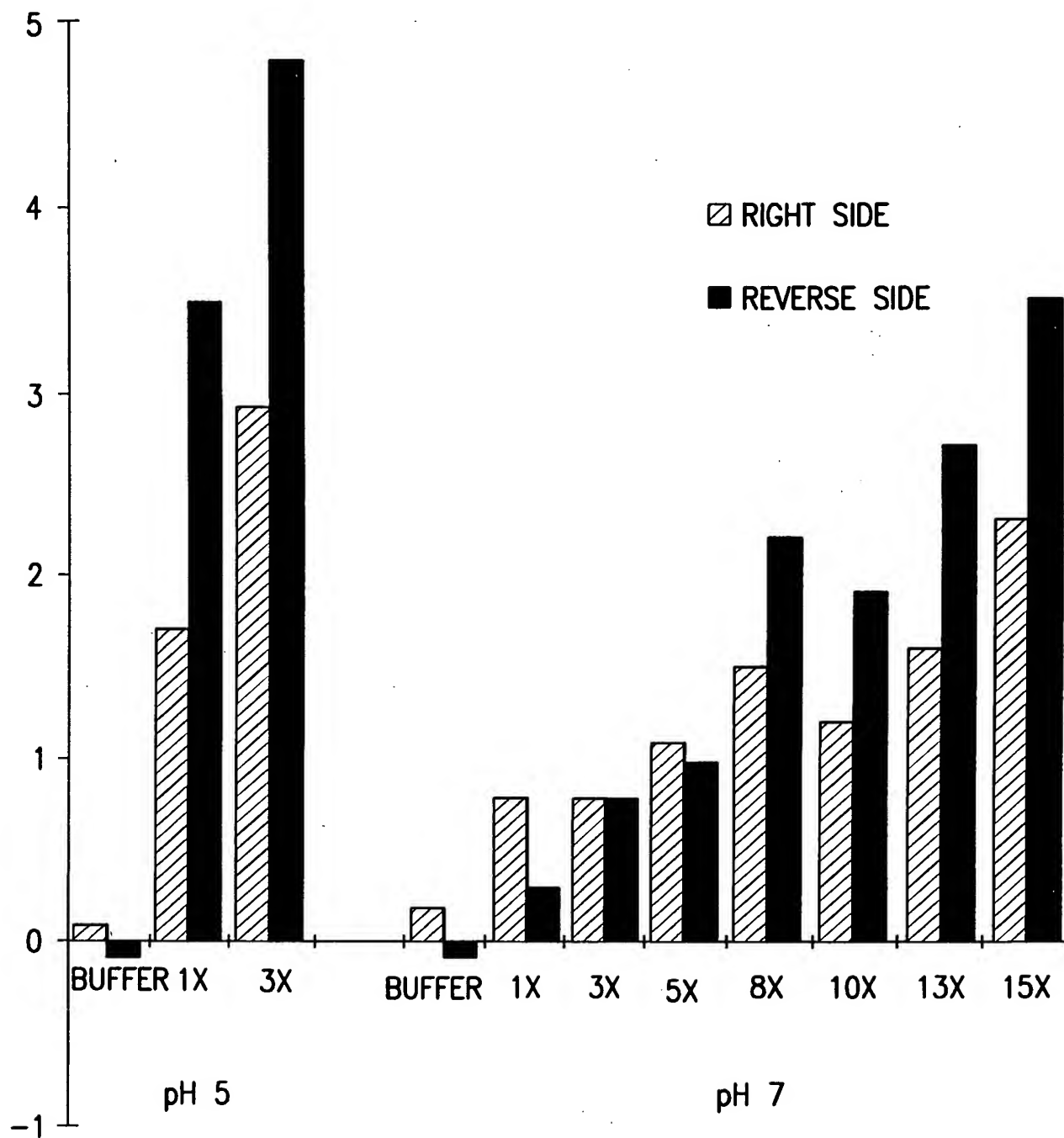


FIG.7B

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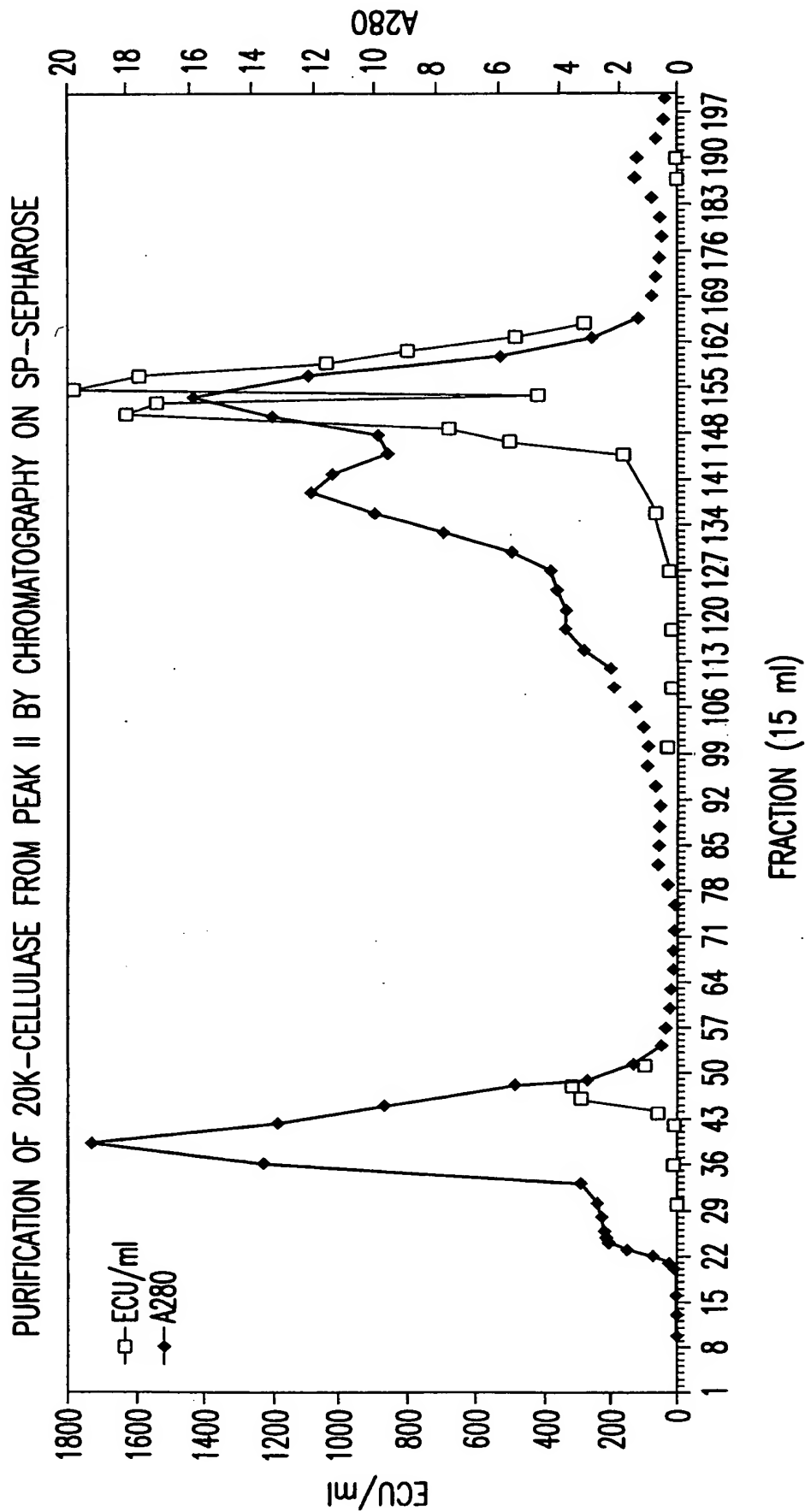


FIG.8

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 Thereof

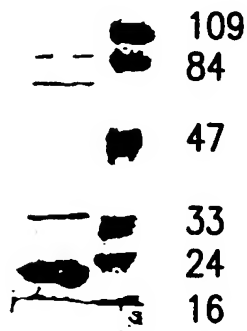


FIG.9A

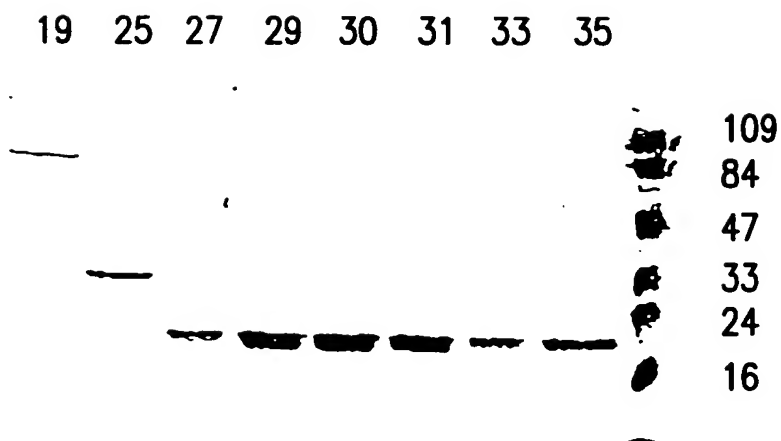


FIG.9B

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 Thereof

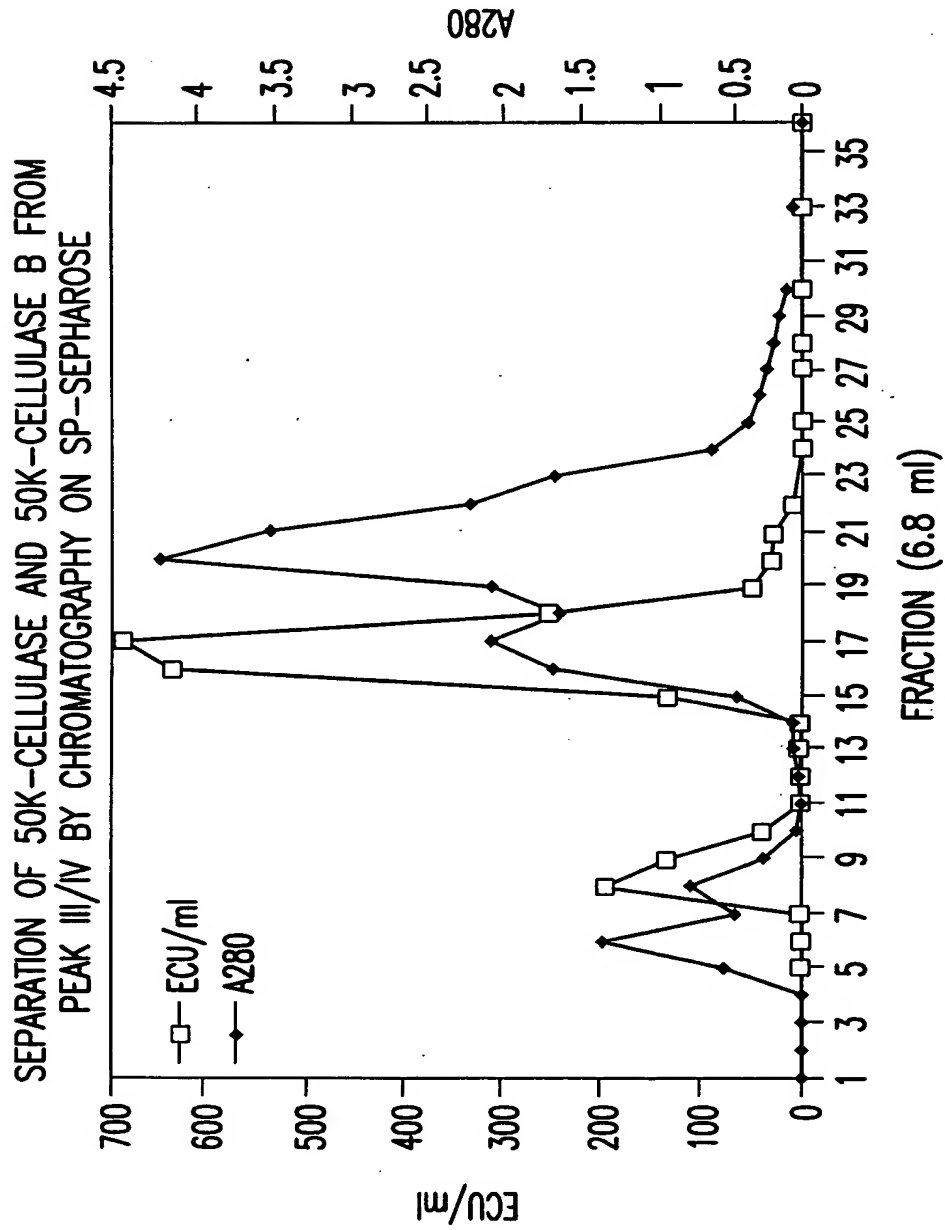


FIG.10

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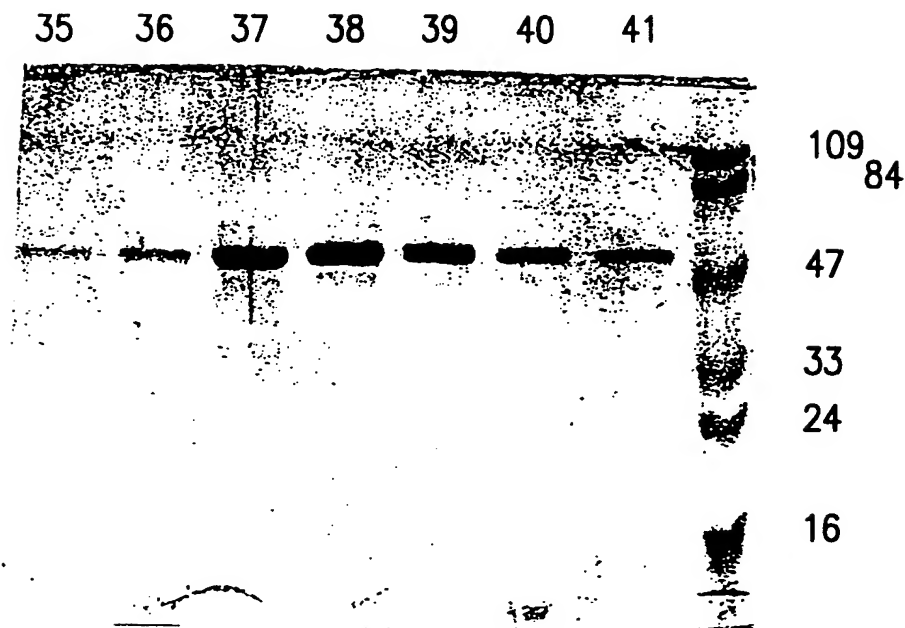


FIG. 11A

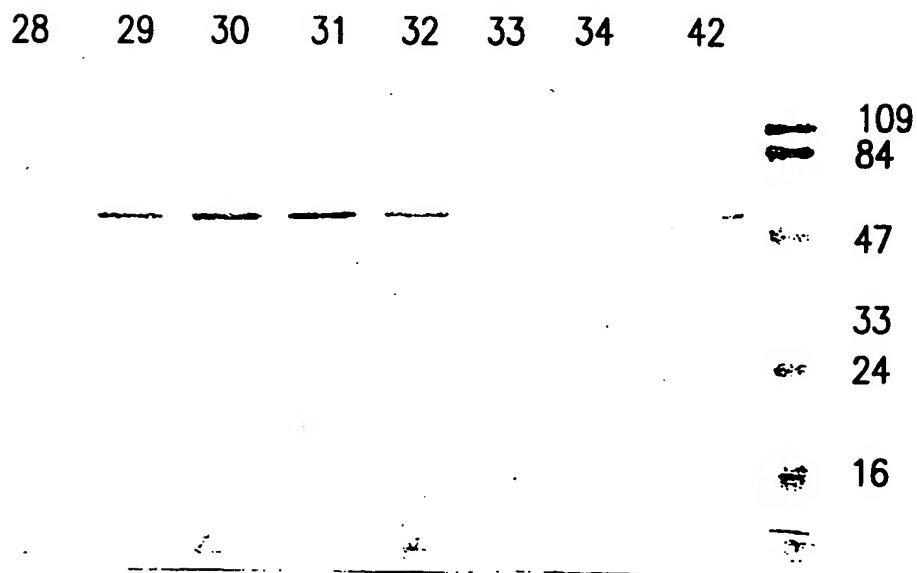


FIG. 11B

BEST AVAILABLE COPY

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TEMPERATURE DEPENDENCE OF THE  
ENDOGLUCANASE ACTIVITY OF 50K-CELLULASE  
AT pH 7.0

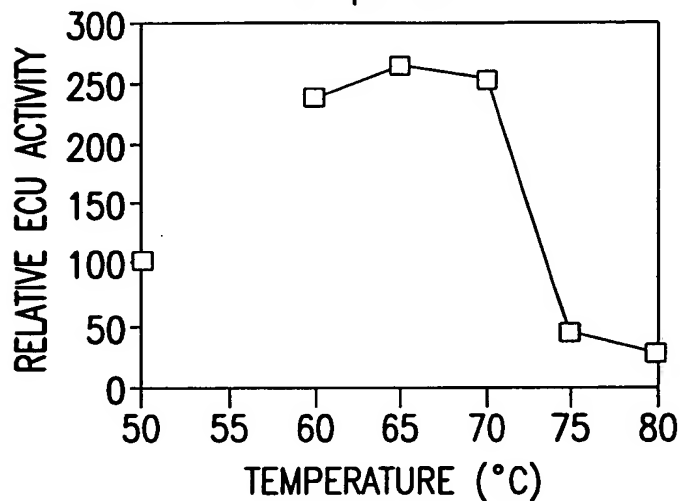


FIG.12

THE pH DEPENDENCE OF THE ENDOGLUCANASE  
ACTIVITY OF 50K-CELLULASE AT 50°C AND 70°C

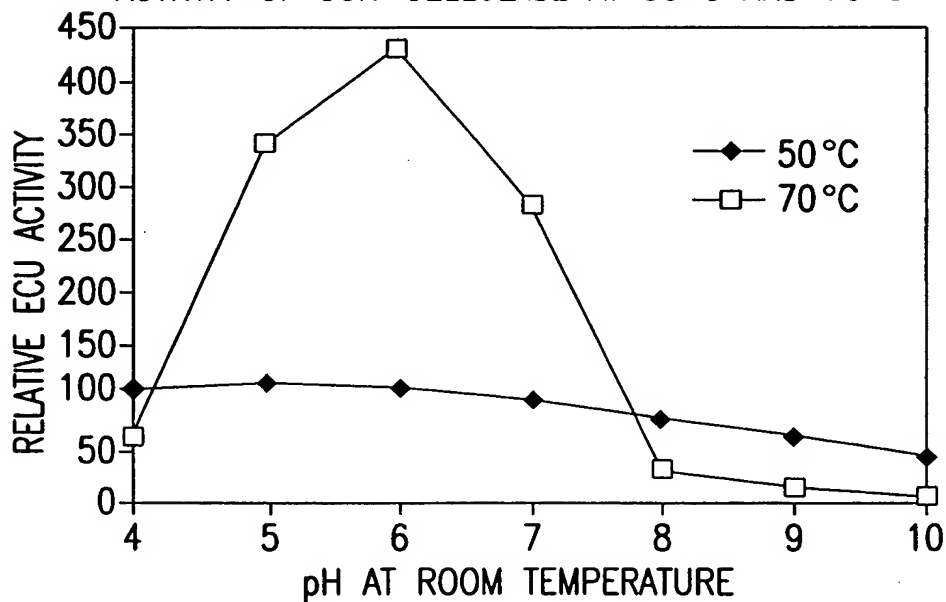


FIG.13

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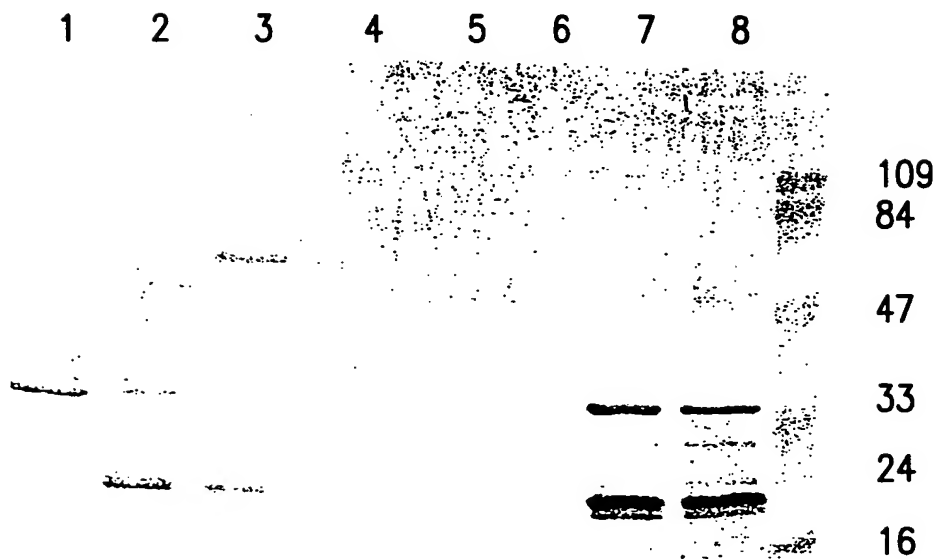


FIG.14

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Thereof

20K-CELLULASE: TEMPERATURE DEPENDENCE OF  
ENDOGLUCANASE ACTIVITY AT pH 7 (10 MIN REACTION  
TIMES)

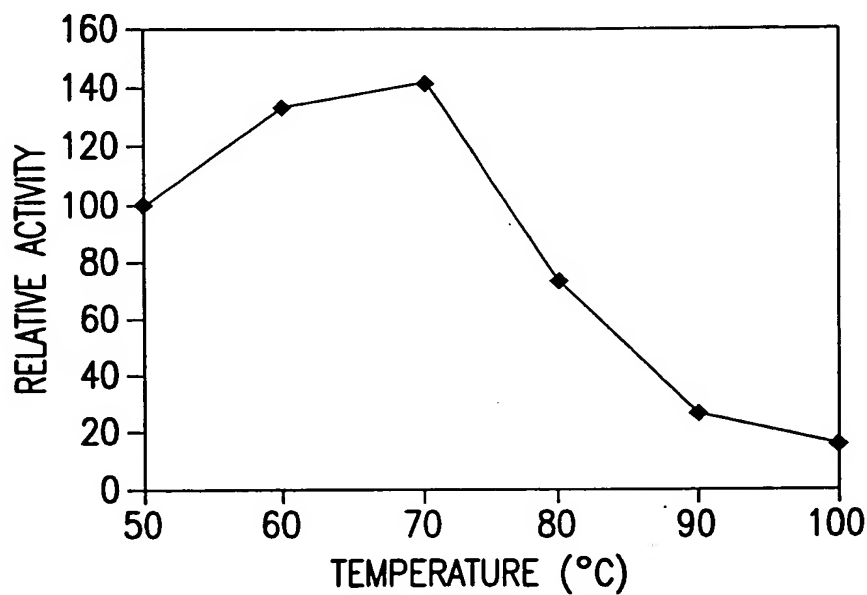


FIG.15



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20K-CELLULASE: pH-DEPENDENCE OF ENDOGLUCANASE  
ACTIVITY (10 MIN REACTION TIMES)

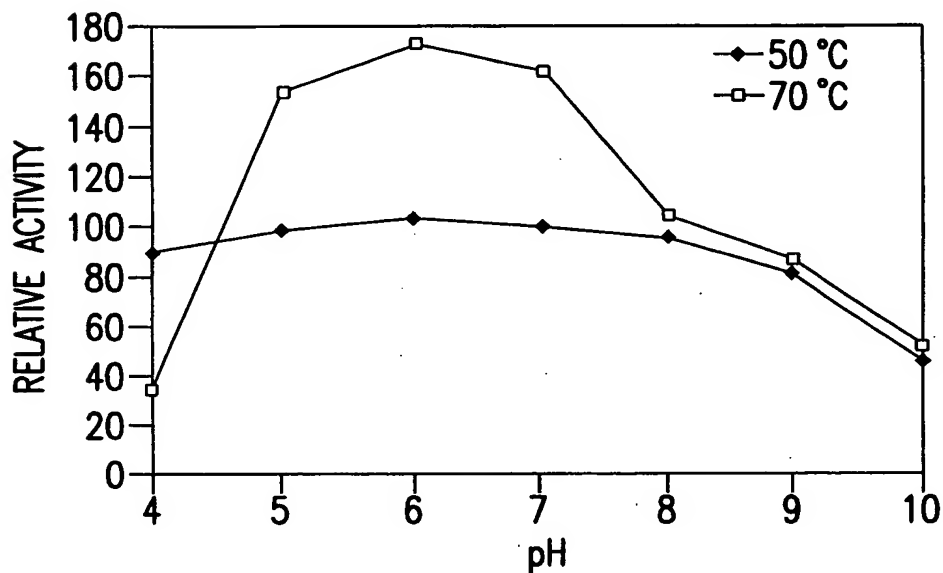


FIG.16A

20K-CELLULASE: pH-DEPENDENCE OF ENDOGLUCANASE  
ACTIVITY (60 MIN REACTION TIMES)

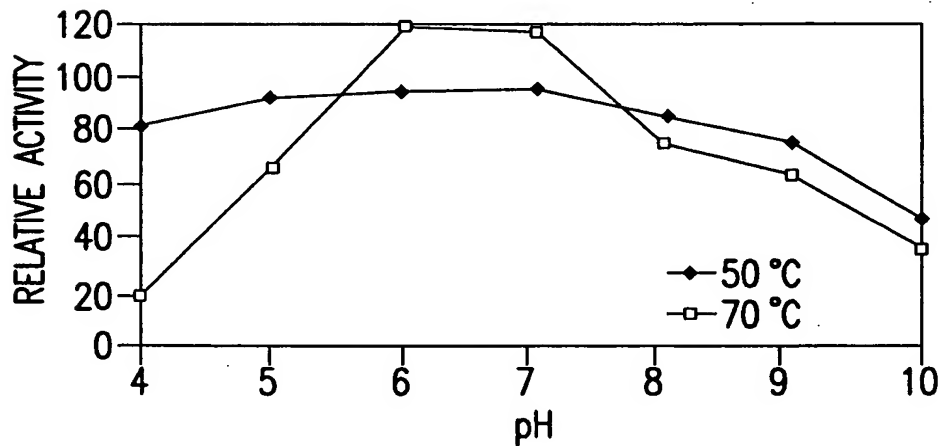


FIG.16B

# 429  
ANGQSTRYWDCKPSCGWRGKGPVNQPVYS

# 430  
YGGISSR

# 431  
CGWR

# 432  
PSCGWR

# 433  
YWDCKK

# 439  
QECDSFPEPLKPGCQWR

fr 9  
RHDDGGFA

fr 14  
YWDCKP

fr 16  
GKGPVNQPVYSCDANFQR

fr 17  
VQCPEELVAR

fr 28  
DWFQNADNPSFTFER

fr 30  
TMVQSTSTGGDLGSNHFDLNIPGGGVGLF

FIG.17

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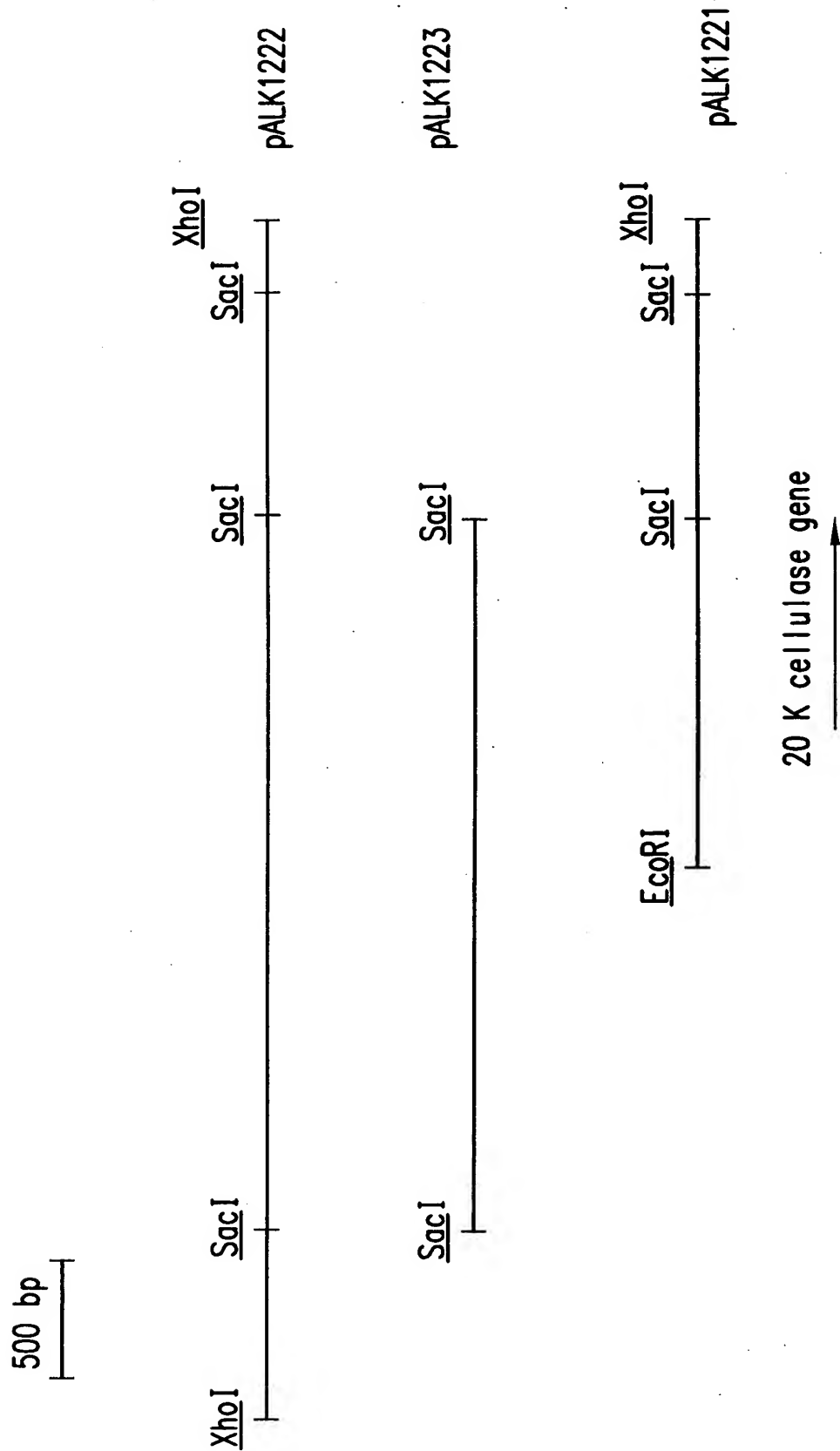


FIG.18

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-30          -10          10          30          50
TCGCCCCTAACCGAGAACCAAGACTCCAAGAATGGGCTCTACTCCCGTTCTCGGGCCCTCTCTGGCCGCGAGCATTGCCCCCTCGGGCCCTCGCCGCCAA
      M R S T P V L R A L L A A L P L G A L A A N
70          90          110          130          150
CGGTCAGTCCACGAGGtaactgacacccgcctcattacgcgtgccgaccggaccgcgttcagggtcactgctcaccgcacccagATACTGGGACTGCT
G Q S T R          Y W D C C
170         190         210         230         250
GCAAGCCGTCGTGGGCTGGCGGGAAGGGCCCGGTGAACCAAGCCCGTCTACTCGTGGCAGCGCAACTTCCAGCGCATCCACGACTTCGATGCCGTCTC
K P S C G W R G K G P V N Q P V Y S C D A N F Q R I H D F D A V S
270         290         310         330         350
GGGCTGCGAGGGCGGCCCGCCTTCTCGTGGCGCGACCAAGCCCTGGGCCATTAAATGACAACCTCTCGTACGGCTTCGGGGCGGACTGCACCTCAGCGGC
G C E G G P A F S C A D H S P W A I N D N L S Y G F A A T A L S G
370         390         410         430         450
CAGACCGAGGAGTCGTGGTGTGCTGCTACGCGtgagtgtgtcttgggcccaacgtcggtgattccggagttcagaccactgacccagcgaccgctc
Q T E E S W C C A C Y A

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FIG.19A

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470          490          510          530          550
gccagTCTGACCTTTACATCGGGTCCCGTGGCCGGCAAGACCATGGTGGTCCAGTCGACACGACGGGGCGGCGACCTCGGCAGCAACCACTTCGACCTCA
      L T F T S G G P V A G K T M V V Q S T S T G G D L G S N H F D L N

570          590          610          630          650
ACATCCCCGGCGGGCGGTGGGCTCTTCGACGGGCTGCACTCCCCAGTTCGGGGGCTCCCGGGCGCACGGTACGGCGGCATCTCGTCGGCGCCAGGAGTG
      I P G G G V G L F D G C T P Q F G G L P G A R Y G G I S S R Q E C

670          690          710          730          750
CGACTCGTTCGCCGAGCCGCTCAAGCCCGGCTGCCAGTGGCGCTTCGACTGGTTCGAGAAGCGCGACAACCCGTCCTTTACCTTCGAGCGGGTCCAGTG C
      D S F P E P L K P G C Q W R F D W F Q N A D N P S F T F E R V Q C

770          790          810          830          850
CCCGAGGAGCTGGTGGTCCGACCGGGCTGCAGGGCGCCACGACGACGGCGGCTTCGCCGCTCTCAAGGCCCCCGAGCGCCTGATCCGTTTTTGGGCAGTGTC
      P E E L V A R T G C R R H D D G G F A V F K A P S A *

870          890
CGTGTGACGGCAGCTACGTGGAACGACCTGGAGCTC

```

Fig. 19B

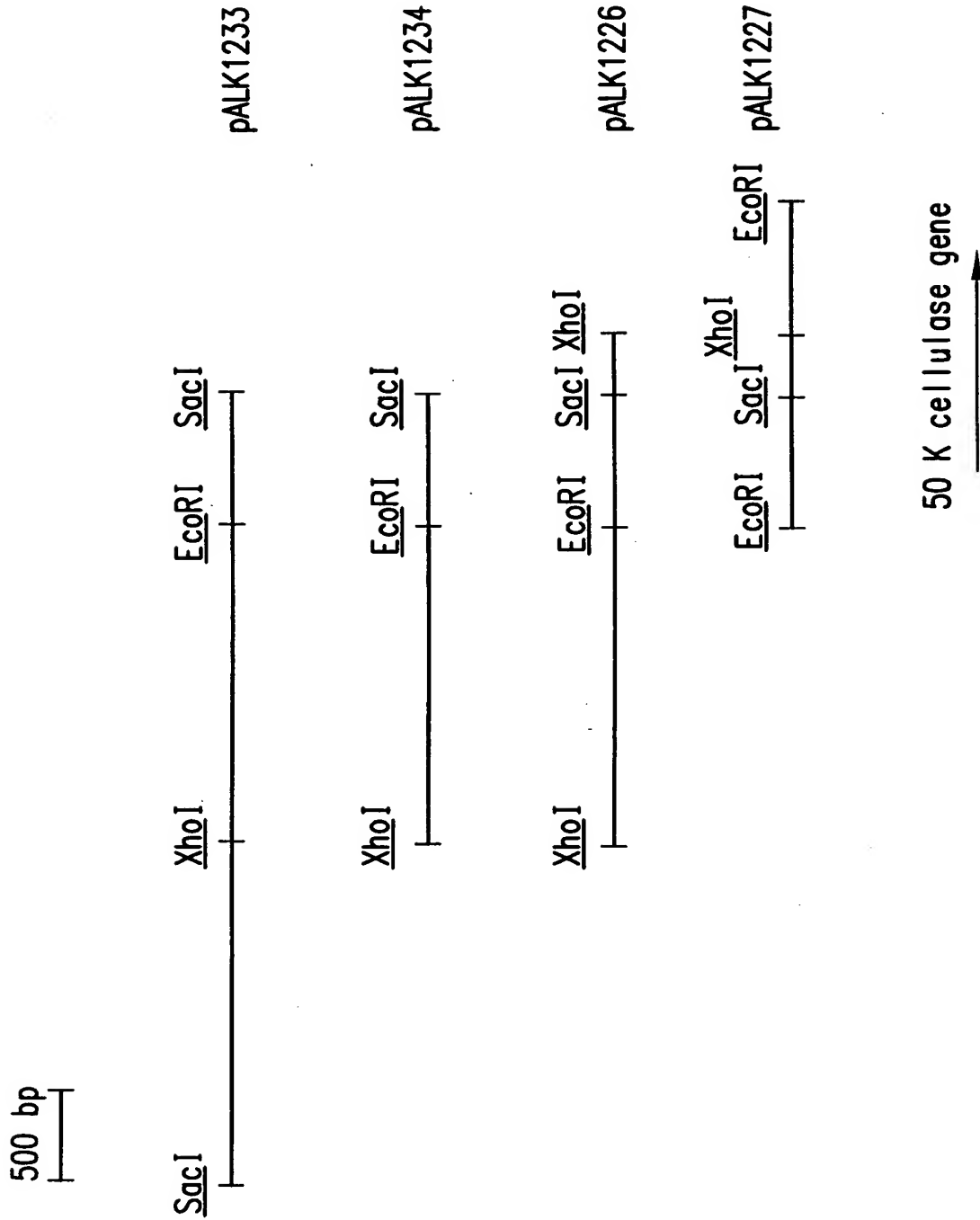


FIG.20

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-230          -210          -190          -170          -150
      GAATTCGGGGGTTGCCAGGGAGTCGTACAGGGGTGGGTGGAGGGGGATGGGGGATGGAAGGGGATGGAGAAGAAAGCATATATGGGACGTTTGTGCTC

-130          -110          -90          -70          -50
      GCCGGCTCCCTCTGCCACGTTCCCTTGCCCTCCCTTGCTGGTGTGTTGGTCTTCCCTTCACCATCCGACAAACCAACCTGCTGCGGGTGAACTCGCA

-30          -10          10          30          50
      GAGCGCCTTCGGACGACGACAGACGACGCCATGACTCGCAACATCGCCCTGCTCGGGCGCGGTGGGGCTCCTGGGCCTCGCCACGGCCAGAAGC
      M T R N I A L L G A A S A L L G L A H G Q K P

70          90          110          130          150
      CGGCGAGACGCGCGAGGTGCACCCGAGCTGACGACGTTCCGGTGCACCAAGGCGGACGGGTGCCAGCCGCGGACCAACTACATTGTGCTGGACTCGCT
      G E T P E V H P Q L T T F R C T K A D G C Q P R T N Y I V L D S L

170          190          210          230          250
      GTCGCACCCGGTGCACACGAGTGGACAACGACTACAACCTGCGGCGACTGGGGGCAGAAAGCCCAACGCGACGGGTGCCCGGACGTCGAGTCGTGCGCGCGC
      S H P V H Q V D N D Y N C G D W G Q K P N A T A C P D V E S C A R

270          290          310          330          350
      AACTGCATCATGGAGGGCGTCCCCGACTACAGCCAGCACGGCGTCACGACGAGCGACACGTCGCTGCGCCTGCAGCAGCTCGTCGACGGCCGCTCGTCA
      N C I M E G V P D Y S Q H G V T T S D T S L R L Q Q L V D G R L V T

```

FIG.21A

```

370          390          410          430          450
CGCCGGCGTCTACCTGCTCGACGAGACCGGACCGCTACGAGATGATGCACCTGACCGGCGGAGGTTCACTTTGAGGTCGACGCCACCAAGCTGCC
P R V Y L L D E T E H R Y E M M H L T G Q E F T F E V D A T K L P

470          490          510          530          550
CTGCGGCATGAACAGGCCCTCTACCTGTCCGAGATGGACCGACCGGGCCCGGAGCGAGCTCAACCCCGGGTGCCTACTACGGCACCGGCTACTGC
C G M N S A L Y L S E M D P T G A R S E L N P G G A Y Y G T G Y C

570          590          610          630          650
GACGCCAGTGTTCGTGACGCCATTTCATCAACGGCATTgtgagtgttcccccttgggccccccctgaaaaatagatgtacctgggtgctaacccccgggg
D A Q C F V T P F I N G I

670          690          710          730          750
tgtcgacccaaaacagGGCAACATCGAGGGCAAGGGCTCGTGTGCAACGAGATGGACATCTGGGAGGCCAACTCGCGGGCGACGCACGTGGCGCGGCAC
G N I E G K G S C C N E M D I W E A N S R A T H V A P H

770          790          810          830          850
ACGTGCAACGACGGGTCTGTACATGTGCGAGGGCGCGAGTGCAGTACGACGGCGTGTGCGACAAGGACGGGTCCGGGTGGAACCGTACCGGGTCA
T C N Q T G L Y M C E G A E C E Y D G V C D K D G C G W N P Y R V N

870          890          910          930          950
ACATCACCAGCTACTACGGCAACTCGGACGGTTCGCGGTGACACGCGGGCGGCCCTTCACCGTGGTGACGCAGTTCCTCGGGCCGACGCCGAGGGCCGGCT
I T D Y Y G N S D A F R V D T R R P F T V V T Q F P A D A E G R L

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FIG. 21B



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970	990	1010	1030	1050
CGAGAGCATCCACCGGCTGTACGTGCAGGACGGCAAGGTGATCGAGTCGTACGTGCGACGCGCGGGCCCTGCCCGGACCGACTCGCTCAACGACGAG				
E S I H R L Y V Q D G K V I E S Y V V D A P G L P R T D S L N D E				
1070	1090	1110	1130	1150
TTCTGGCGCGCCACGGGGCGCGGCTACCTCGACCTCGGCGGACCGCGGGCATGGCGGACGCCATGACGCGGCGCATGGTGTGGCCATGAGCATCT				
F C A A T G A A R Y L D L G G T A G M G D A M T R G M V L A M S I W				
1170	1190	1210	1230	1250
GGTGGGACGAGTCCGGCTTCATGAACCTGGCTCGACAGCGGGGAGCGGGCCCTGCCTGCCGACGAGGGCGACCCCAAGAACATTGTCAAGGTCGAGCC				
W D E S G F M N W L D S G E A G P C L P D E G D P K N I V K V E P				
1270	1290	1310	1330	1350
CAGCCCCGAGGTCACCTACAGCAACCTGCGCTGGGGCGAGATCGGGTCGACCTTTGAGGCGGAGTCCGACGACGACGGCGGACGGCGACGACTGCTAGATA				
S P E V T Y S N L R W G E I G S T F E A E S D D G D G D C *				
1370	1390	1410	1430	1450
ACTAACTAGTGGGCGGAAGGGCGGGGATGCGTAACCTACATACAGCCCGGAGTTGTTTGAGTGTAGAGTATTGAGCTTTCGATGTTAGTTGAGTG				
1470	1490	1510	1530	1550
GAATGGAAAATTCGGCTCTTTGCCCGGTTGGGATGCGATAAACAATAGTCGGCTGGTGCATTGTGACACTTCAATTGGCGTGTGGCTTGGTGACAGACA				
1570	1590	1610	1630	1650
CGGCAGGTCGATGACCCGACACCCAGAATAATTCGCATGGTTGATTANTGTTATTGTGCTTTAAATCGGAGGCTGATGCTCATCTCTCGAATTC				

FIG.21C

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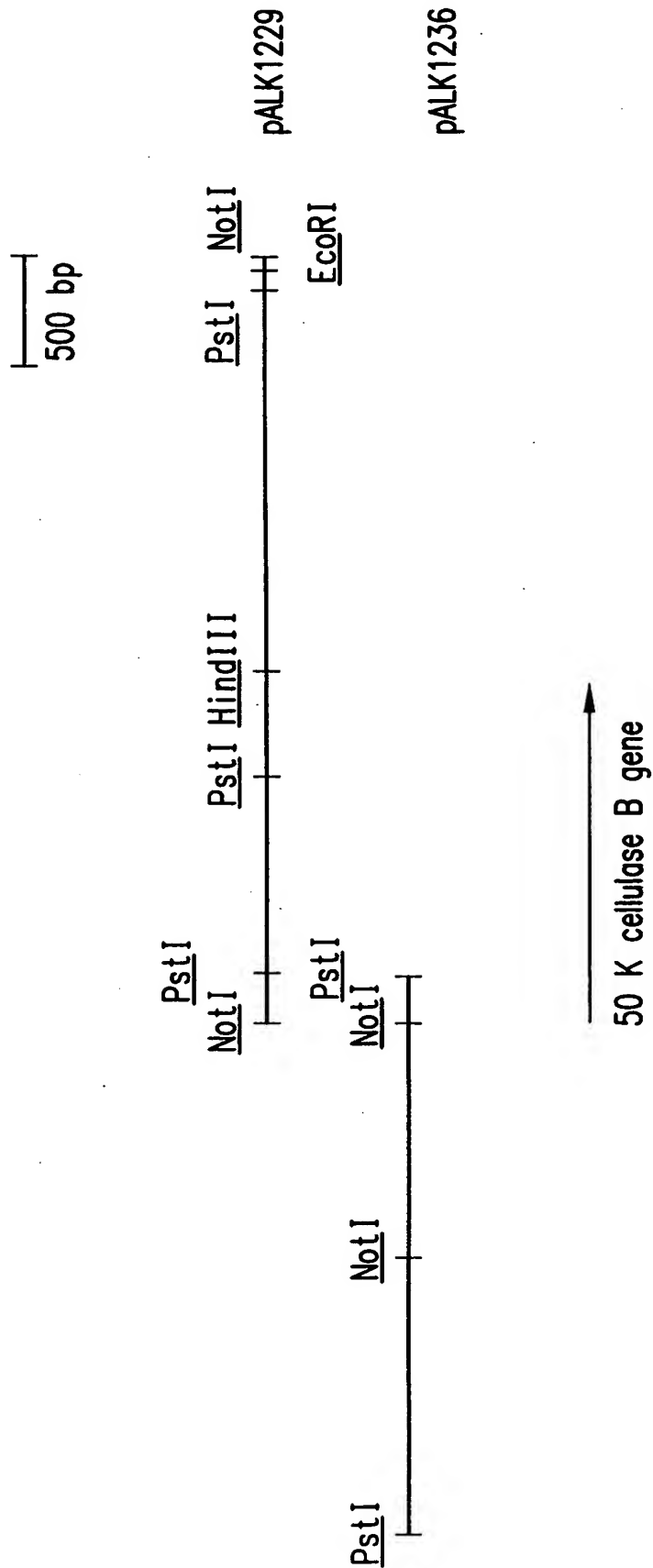


FIG.22

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-150      -130      -110      -90      -70
CCC GGTCTGGAGACGGGGAGCGCGCCAGCGACGCAGGATAAGAAAGGCGACGACCGCGCCTCCGAGCCAGGCCCCAGGACAGCAGGAGAACTCGCCACGGGC

-50      -30      -10      10      30
AAGCAGCAGCGCCCGATCGACAGTGTCCCGCTCTGCCACAGCACTCTGCAACCATGATGATGAAGCAGTACCTCCAGTACCTCGCGGCGCGCTGCCGCT
      M M M K Q Y L Q Y L A A A L P L

50      70      90      110      130
CGTCGGCCTCGCCGCGCGCGCTGGTAACGAGACGCCGCGAGAACCCCGCTCACCTGGCAGAGGTGCACGGGCCCGGGCAACTGCCAGACC
V G L A A G Q R A G N E T P E N H P P L T W Q R C T A P G N C Q T

150      170      190      210      230
GTGAACGCCGAGGTGTCATTGACGCCAACTGGCGCTGGTGACGACGACGACAACATGCAGAACTGCTACGACGGCAACCACTGGACCAACGCCTGCAGCA
V N A E V V I D A N W R W L H D D N M Q N C Y D G N Q W T N A C S T

250      270      290      310      330
CCGCCACCGACTGCGCTGAGAAGTGCATGATCGAGGGTGCCGGCGGACTACCTGGGCACCTACGGCGCCTCGACCGGGCGCCTGACCGCTCAAGTT
A T D C A E K C M I E G A G D Y L G T Y G A S T S G D A L T L K F

350      370      390      410      430
CGTCACCAAGCAGGATACGGCACCAACGTCGGCTCGCGCTTCTACCTCATGAACGGCCCGGACAAAGTACCAGATGTTCAACCTCATGGGCAACGAGCTT
V T K H E Y G T N V G S R F Y L M N G P D K Y Q M F N L M G N E L

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FIG. 23A

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450          470          490          510          530
GCCTTTGACGTGACCTCTCGACCGTCGAGTGGCGCATCAACAGCGCCCTGTACTTCGTGCGCCATGGAGGAGGACGGCGGCATGGCCAGCTACCCGAGCA
A F D V D L S T V E C G I N S A L Y F V A M E D G G M A S Y P S N

550          570          590          610          630
ACCAGCGCGCGCCGGTACGGCCTGAGTGGGTGAGTGTGCTGAGTGCgaacgaggcaactttctggcgccgctaactctctcgattc
Q A G A R Y G T G

650          670          690          710          730
ctccgacagTACTGCGATGCCCCAATGCGCTCGTGTATCTCAAGTTCGTGGCGGCAAGGCCAACATTGAGGGCTGGAAGTCGTCCACGAGCGACCCCAACG
Y C D A Q C A R D L K F V G G K A N I E G W K S S T S D P N A

750          770          790          810          830
CTGGCGTCGGCCCGTACGGCAGCTGTCTGGCTGAGATCGACGCTGTgtgagtcgagaccgtccaccaggtttcggaatcggggtggaatttcgcggct
G V G P Y G S C C A E I D V W

850          870          890          910          930
aacggagcacccccagGGAGTCGAATGCCTATGCCCTTCGCTTCACGCCGCGCAGCGTGCACGACCAACGAGTACCACGCTCTGCGAGACCCAACTGCG
E S N A Y A F A F T P H A C T T N E Y H V C E T T N C G

950          970          990          1010          1030
GTGGCACCTACTCGGAGGACCGCTTCGCCGGCAAGTGGACGCCAACGGCTGCGACTACAACCCCTACCGCATGGGCAACCCCGACTTCTACGGCAAGGG
G T Y S E D R F A G K C D A N G C D Y N P Y R M G N P D F Y G K G

1050          1070          1090          1110          1130
CAAGACGCTCGACACCGCGCAAGTTCAGtgctgaccccttgtggcgcaacctttctctgcctgcctggacacactgaaactgacacgtcgttttcg
K T L D T S R K F T

```

FIG.23B

FIG. 23C

Appl. No. *To Be Assigned*; Filed: *Herewith*  
 Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
 Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
 Title: Novel Cellulases, the Genes Encoding Them and Uses Thereof

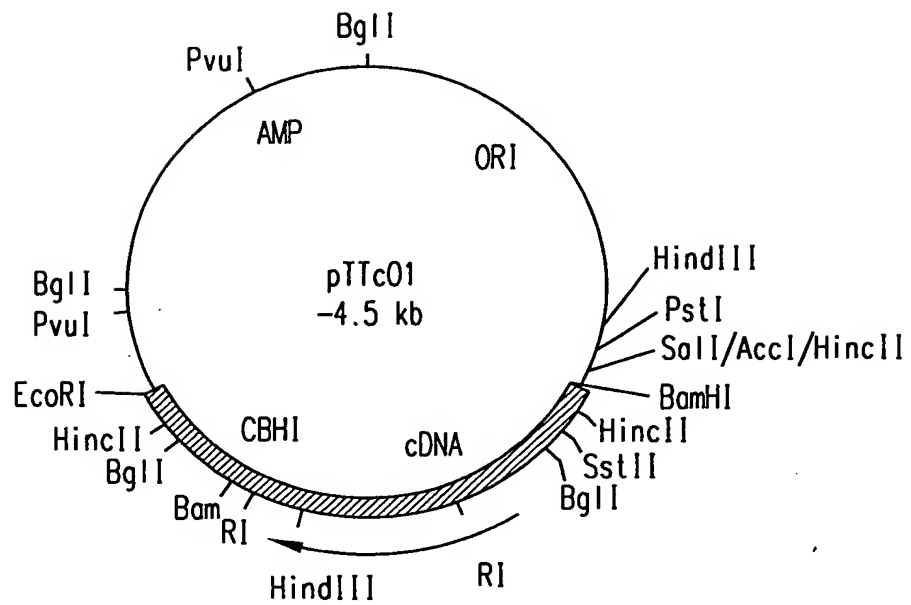


FIG.24

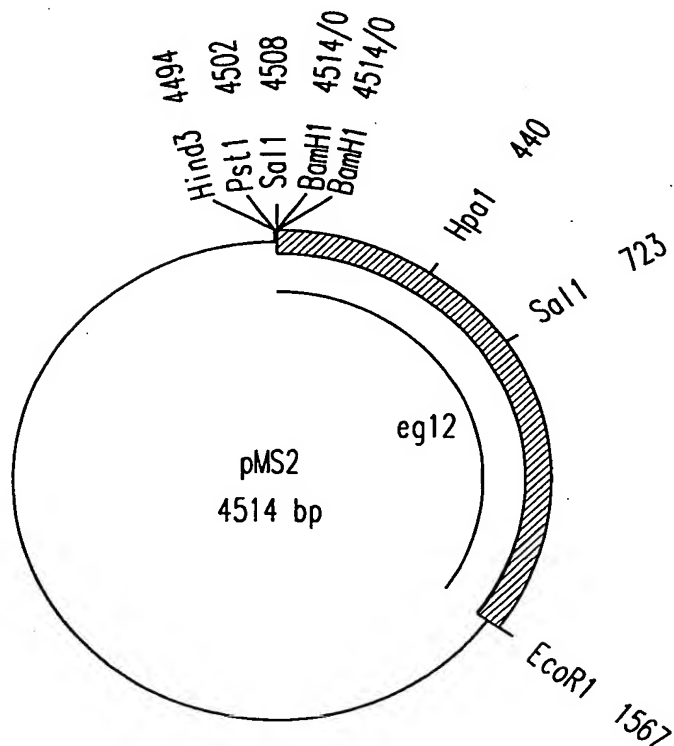
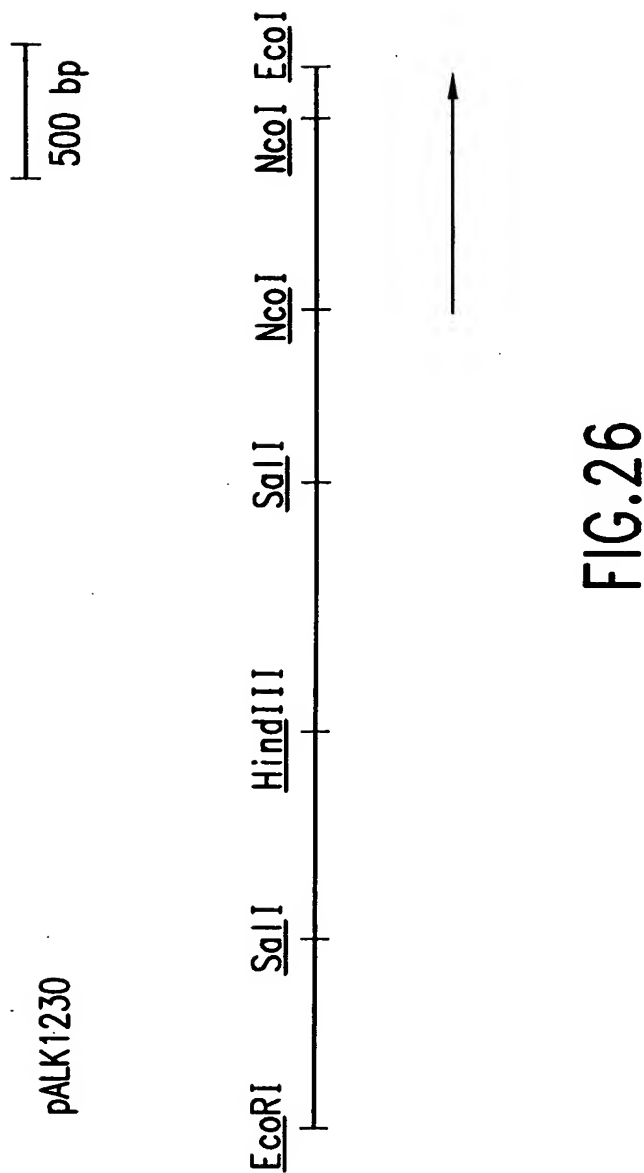


FIG.25

Appl. No. *To Be Assigned*; Filed: *Herewith*  
 Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
 Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
 Title: Novel Cellulases, the Genes Encoding Them and Uses  
 Thereof



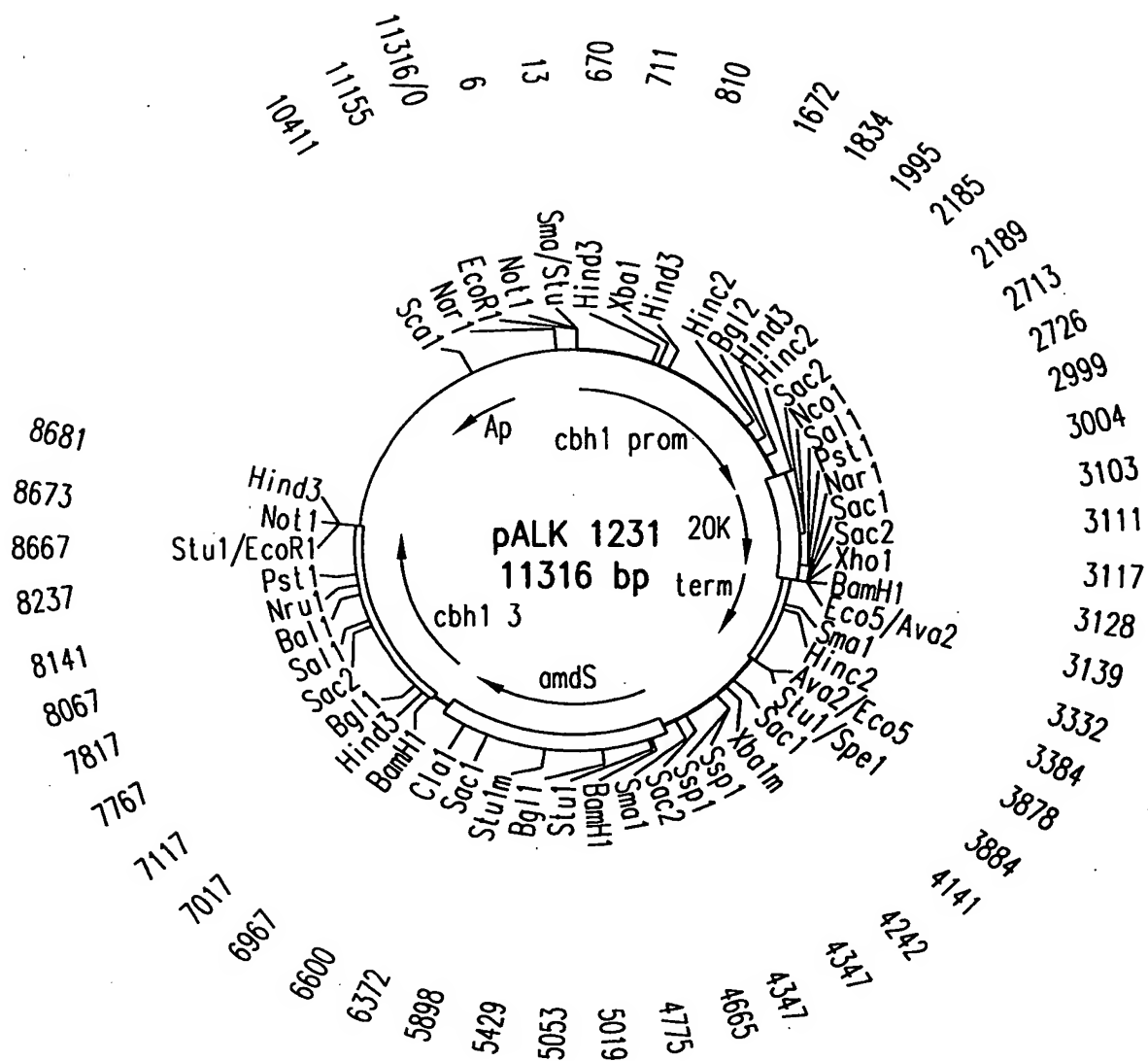
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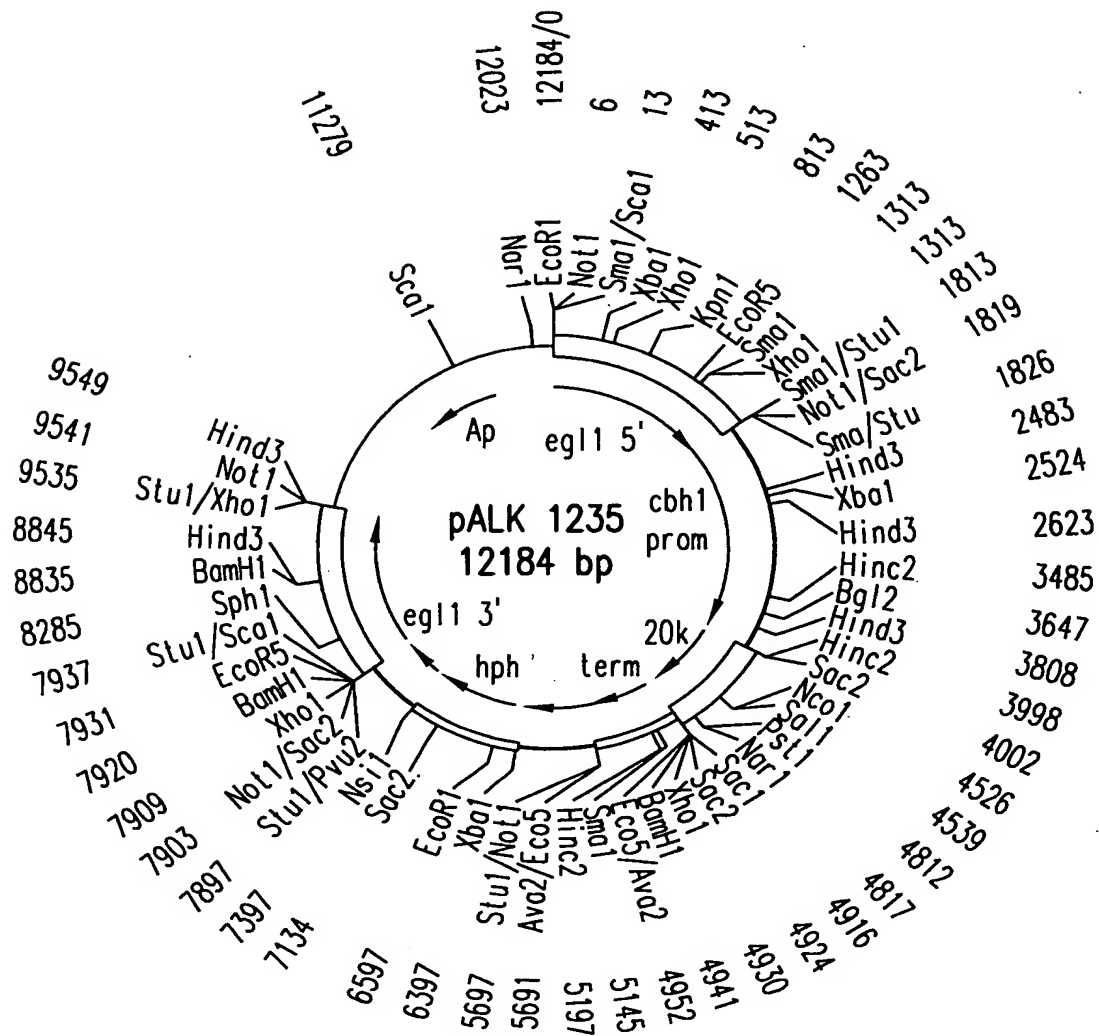
10          30          50          70          90
CCATGGACGCGAACTGCGACGCTCTTCTGCCCCGAGCTGAAGACCCAGAGCATCCAGACCGGCAACCACTGCACCCAGGAGATGAAGGTCTACGAGAACAT
110        130        150        170        190
TGACGGCTGGCTCGACAGCCTGCCCGGCAACGTCCCCCATCACCGGTCGCGAGCCGGCTCTGGTAAGTCAAGAGATGATGCCTACCTACCTTCCACCT
210        230        250        270        290
TCCACCCAGCGCAATAACCTTTCTCCCTCCCGTGCCCGTATCTTCAACGCCCGAGACTGACAGACCCGCTCGTCCCAGGGGCAACCCCGGCA
310        330        350        370        390
ACGGCGGGGAGCAACCCGGGCAACGGGCGGGCGGGGCTGCACCGTCCAGAAAGTGGGGCCAGTGGGGCGGCATCGGCTACTCGGGCTGCACCACTG
410        430        450        470        490
CAAGGCGGGCTCGACCTGCCCGGCCAGAACGAGTACTACTCGCAGTGCCTGTAAAGCGGCCGTGGGCTAGGTGGCCGAGCGGGGGGTTTCTTCATTGG
K A G S T C P A Q N E Y Y S Q C L *
510        530        550        570        590
TTGAGCAAATAGAACAGGAATTCGGGCTGTTGGCAGCGGCGCGCGGGGATGGTGTGTACAATTCAAGACCTCAGTACCGAGGGACCTGGAAAGGA
610        630        650        670        690
GTCAGTCTGCTTGACGGAGGCTGGCTGCCCGCGTGGCGGCGCTGGCAAGGTAGTAGCCCTTCATTGCTGTAACTAGTATGCTATATACCTCTGCACAT
710        730        750        770        790
TGCAGCCCCATGGTGTGAACAACAAGTGACAAGGCTTCCAGTTCAGGCTCGCGCAATTGTCAGGATATCCTTGGTCCATCTATATGTAIGGGCATGAGC
810        830        850        870
GAGTCGAGAAAATGTACCGCGAAAAATCGTAGTACCTGGCACTGGCGGCTTCTACCACCGTAGGATTGAAGTGAATCTCGAATTC

```

FIG. 27







Appl. No. *To Be Assigned*; Filed: *Herewith*  
Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
Title: Novel Cellulases, the Genes Encoding Them and Uses  
Thereof

1 2 3 4 5 6

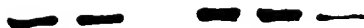


FIG.30



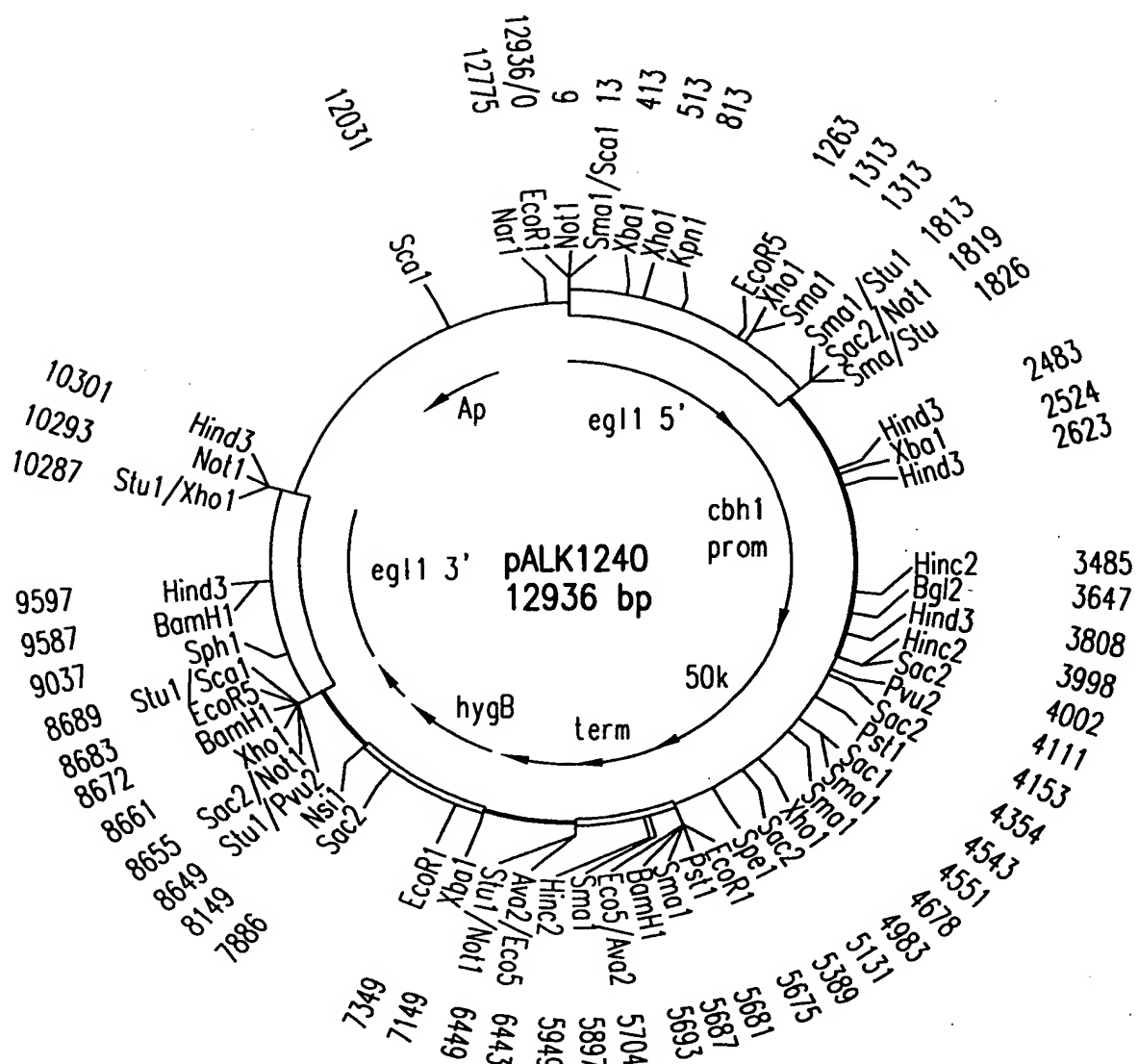


FIG.32